PROJECT MANUAL

Poudre High School

Main Entry Renovation

POUDRE SCHOOL DISTRICT

Owner:
Poudre School District
2407 LaPorte Avenue
Fort Collins,
Colorado 80521

Architect:
KALERT | Consulting Group, LLC
2429 Stonecrest Drive
Fort Collins, CO 80521

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Latex joint sealants.
   4. Acoustical joint sealants.

B. Related Sections:
   1. Section 088000 "Glazing" for glazing sealants.

C. Product Data: For each joint-sealant product indicated.

D. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

E. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

F. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

G. Field-Adhesion Test Reports: For each sealant application tested.

H. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

D. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.5 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 790.
      b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
      c. Pecora Corporation; 890.
      d. Sika Corporation, Construction Products Division; SikaSil-C990.
      e. Tremco Incorporated; Spectrem 1.
   2. Joint Locations:
      f. Perimeter joints between interior/exterior aluminum door frames, and other surfaces.

2.3 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. BASF Building Systems; Sonolac.
      b. Bostik, Inc.; Chem-Calk 600.
      c. Pecora Corporation; AC-20+.
      d. Tremco Incorporated; Tremflex 834.
   2. Joint Locations:
      e. Perimeter joints between interior/exterior wall surfaces and frames of interior/exterior door frames and walls.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
      a. Masonry.
   3. Remove laitance and form-release agents from concrete.
   4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
      a. Metal.
      b. Glass.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
   4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
   5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 084213 – ALUMINUM DOORS – MONUMENTAL (BASE BID & ADDITIVE ALTERNATE #1)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes Tubelite Monumental Entrance Series and all system components and installation accessories.
   1. Tubelite Monumental Wide Series

1.02 RELATED PRODUCTS

A. Single Manufacture: All products in divisions listed below shall be supplied by a single manufacturer. To ensure consistency in quality, warranty, finish, and product compatibility, products supplied by different manufacturers are not acceptable.
   a. Division 084313 – Aluminum Framed Storefronts
   b. Division 08700 - Hardware

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.
B. Pre-installation Meeting:
   a. Attendees: Owner's Representative, Architect, General Contractor, Owner Locksmith, Entrance Manufacturer's Representative, and installers whose work interfaces with entrance, glazing, and electrified hardware.
   2. Agenda:
      a. Review and finalize construction schedule.
      b. Verify availability of materials, installer's personnel, equipment, and facilities required to maintain schedule.
      c. Review means and methods related to installation, including manufacturer's written instructions.
      d. Examine support conditions for compliance with requirements including alignment and attachment to structural members.
      e. Review flashings, membrane interface with entrance, wall penetrations, openings, and conditions of other construction affecting this Work.
      f. Review temporary protection requirements for during and after installation of this Work.

1.04 SUBMITTALS

A. Product Data:
   1. Manufacturer's literature for each specified system.
   2. Components within assembly, including material descriptions, component profiles, finishes, anchorage and fasteners, glazing, and internal drainage.
B. Shop Drawings:
   1. Shop drawings must be prepared by a qualified engineering service under the employ of the [entrance manufacturer] [installer].
   2. Include system dimensions, framed opening requirements and tolerances, affected related Work, anchorage, expansion and contraction joint location and details, and field welding required.
   3. Include scaled shop drawings showing detailed relationships with glazing, flashing, internal drainage, joinery, and provisions for thermal expansion.
C. Samples:
   1. System components: Submit corner samples, anchors, fasteners, trim, and other materials as requested by the architect.
   2. Finish: Submit two aluminum sheet stock samples 2" x 3" for each finish type.

D. Warranty: Submit manufacturer sample warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
E. Entrance Door Hardware Schedule: Coordinate entrance door hardware schedule with doors, frames, and related work for sizes, orientation, thickness, hardware types, electrified hardware, security, and finishes.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least twenty years of documented experience.
B. Installer: Company approved by manufacturer and specializing in performing work of this section with at least 5 years of documented installation experience.
C. Source Limitations: Obtain the entrances and all products listed in Section 1.02 from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Materials to be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.
B. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.
B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before fabrication of entrance framing and indicate measurements on Shop Drawings.
C. Install sealant according to sealant manufacturer guidelines.
D. Coordinate installation with other applicable trades.

1.08 WARRANTY

A. Aluminum Monumental Entrance Warranty:
   1. Manufacturer agrees to repair or replace defective entrance components for a period of 5 years from the date of shipment. .
   2. The warranty for Tubelite's tie rod corner construction extends to the useful life of the entrance door.
B. Finish Warranty:
   1. Warranty covers factory-applied organic and anodic finishes on exposed extruded aluminum surfaces without standing water accumulation, against peeling, checking, cracking, chalking and change of color, per applicable AAMA specifications.
      a. Anodized Coatings
      i. AAMA 611 Class I: 5

PART 2 PRODUCTS

2.01 BASE BID MANUFACTURER

A. Basis of Design (BASE BID):
   1. Tubelite Inc. Monumental Entrance Series: Wide stile.
   2. Substitutions
      a. Manufacturer's products that meet specified design requirements may be considered as a substitution. Substitution requests / submittals must include the following, and be submitted at least ten working days prior to the bid date.
         i. Submittal information must include test reports as specified in performance sections.

ii. Copy of manufactures warranty
iii. Any additional information as requested
iv. System details / samples

2.02 ALUMINUM DOORS - MONUMENTAL

A. Aluminum Doors: Factory fabricated, field glazed, factory finished aluminum, with tie rod construction.
1. System description:
a. Interior Doors: Wide, Double Doors (3 pairs, 6 doors total)
b. Exterior Doors: Wide, Double Doors (3 pairs, 6 doors total)

TYPE	VERTICAL STILES	TOP RAIL	BOTTOM RAIL	OPTIONAL BOTTOM RAIL
WIDE	Reference drawings	Reference drawings	Reference drawings	Reference drawings

c. Depth: 2”
d. Threshold: Reference Hardware schedule.
2. Glass and Glazing:
a. Thickness:
i. Interior Doors 5/16” Laminated Safety Glass
ii. Exterior Doors 1” Insulated Glazing Unit
b. Method: Outside Glazing
c. Reference 088000-Glazing

2.03 FINISHES

A. Finish all exposed areas of Aluminum Doors in accordance with applicable AAMA Voluntary Finish Guide Specification:

SPECIFICATION	DESCRIPTION	DESIGNATION	COLOR
AAMA 611	Class I - Clear anodize coating, Eco-friendly etch (0.7 mils thick min)	AA-M10C21A41	Clear

A. Combination anodic oxide and transparent organic coatings as defined in AAMA 612 are not equivalent substitutions for the AAMA 611 anodized finishes shown above due to surface hardness disparities.
B. Applicator Qualifications: Certified by AAMA and listed on AAMA Verified Components List.
C. Verify accuracy of components, quantities, and sizes prior to application of finishes.
a. Offer both standard eco-friendly (acid) and optional caustic (traditional) etching technologies.
b. Utilize fully automated, computer-controlled process lines for consistency through Project.
c. Utilize documented quality control protocol in accordance with AAMA 611 procedures.
i. Online quality assurance inspection:
1. Random sample check for color uniformity, maximum difference of 5AE.
2. Random coating thickness testing:
a. Class I clear and color anodize – 0.7 mils (18 microns)

2.04 MATERIALS

A. Aluminum extrusions: 6063-T6 or 6063-T5 alloy and temper in accordance with ASTM B221, and extruded within commercial tolerances and free from defects that impair strength and/or durability.

B. Tie rods: Steel tension tie-rods of 3/8” diameter shall run the full width of the top and bottom rails and shall be fixed with steel plates and lock nuts.
C. Weatherstrip: Entrance frame members shall have continuous wool pile/vinyl fin weatherstripping at the head and jamb members.
D. Threshold Blade Sweep: Aluminum extrusion with EPDM blade sweep gasket attached to interior exposed surface of bottom rail with concealed fasteners. *(required to meet specified air performance)*
E. Primary extruded rail and stile members will be a minimum 3/16" thick.
F. Entrance frames shall be 3/16” thick at critical areas, transom frames 1/8” minimum thick.
G. Extruded or formed trim components will be a minimum 0.050" thick.
H. Glazing and Sealant material:
   1. Refer to section 08 80 00.
   2. Glazing gaskets shall be replaceable and made from extruded EPDM reinforced with non-stretchable integral cord.
   3. Setting blocks and Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual and glass manufacture.
   4. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
   5. Frame joinery sealants shall be suitable for application specified and as tested and approved by the entrance manufacturer.

2.05 FABRICATION

A. Ensure joints and corners are flush, hairline and weatherproof, accurately fitted and secured.
   1. Prepare framework to receive anchors and hardware.
   2. Conceal fasteners from view.
   3. Reinforce framework as required for imposed loads.
B. Expansion and Contraction: Fabricate to allow for thermal movement of materials when subjected to project temperature differential requirements.
D. Allow for movement between entrance and adjacent construction, without damage to components or deterioration of seals.
E. Provide for membrane interface as indicated on architectural drawings.
F. Fabricate entrance door corners using steel tie rods connection design allowing for field adjustment.

2.06 ADD/ALTERNATE FRP/ALUMINUM HYBRID DOORS

A. Manufacturer.
   i. Special-Lite, Inc.
      1. PO Box 6, Decatur, Michigan 49045.
      2. Toll Free (800) 821-6531, Phone (269) 423-7068, Fax (800) 423-7610.
      3. Web Site www.special-lite.com.
      4. E-Mail info@special-lite.com.

B. DESCRIPTION

A. Model.
   i. SL-14 Medium Stile Monumental Door.
B. Door Opening Size.
   i. Reference Drawings
C. Construction.
   i. Door Thickness.
      1. 2”.

ii. Stiles.
- **1.** 3-1/2” wide with integral glass stop on exterior side, no snap or applied stops allowed.
- **2.** Aluminum extrusions made from 6063 aluminum alloys with a minimum temper of T5.
- **3.** Screw or snap in place applied caps are not acceptable.
- **4.** Meeting stiles to include integral pocket to accept pile brush weather seal.

iii. Rails.
- **1.** Top Rail Height.
  - **a. Reference Drawings**
- **2.** Bottom Rail Height.
  - **a. Reference Drawings**
- **3.** Integral glass stops on exterior side, no snap or applied stops allowed.
- **4.** Aluminum extrusions made from 6063 aluminum alloys with a minimum temper of T5.
- **5.** Screw or snap in place applied caps are not acceptable.

iv. Corners.
- **1.** True mortise and tenon joints.
- **2.** Secured with 3/8” diameter full-width steel tie rod.
- **3.** Weld, glue, or other methods of corner joinery are not acceptable.

v. Mid Rail.
- **1.** Width:
  - **a. Reference Drawings**
- **2.** One-piece extrusion with integral exterior glass stops.
- **3.** Secure to vertical stiles with mortise & tenon joints with 3/8” steel tie rods and locking hex nuts.

vi. Mid Panel.
- **1.** Model SL-484.
- **2.** 12” high.
- **3.** Core.
  - a. Poured-in-place polyurethane foam.
  - b. Laid in foam cores are not acceptable.
  - c. Foam Plastic Insulated Doors: IBC 2603.4.
    - i. Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
    - ii. Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.
    - iii. IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032” aluminum or 0.016” steel.
    - iv. Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. If no independent testing conducted all doors with foam plastic core must have a thermal barrier.
  - d. Frame.
    - i. Aluminum extrusions with extruded spline and interlocking edges to secure face sheet.

e. Secured to stiles with mortise & tenon joints and two 3/8" steel tie rods with locking hex nuts.

4. Face Sheet.
   a. Exterior.
      i. Aluminum
         1. Optional 0.125" thick smooth aluminum sheet.
         2. Texture.
            a. Embossed.
   b. Interior.
      i. Aluminum
         1. Optional 0.125" thick smooth aluminum sheet.
         2. Texture.
            a. Embossed.

2.07 STANDARD HARDWARE (BASE BID and ADD/ALTERNATE)

A. Reference Specification Section 08700 – Hardware

PART 3 – EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of this Work.
B. Notify Contractor in writing, with a copy sent to Owner and Architect, of any conditions detrimental to proper and timely completion of this Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Start of this Work shall indicate acceptance of areas and conditions as satisfactory by the Installer.

3.02 INSTALLATION

A. Preparation: Coordinate and furnish anchors, concrete inserts, sleeves, anchor bolts, and other accessories to be embedded in concrete or masonry construction or welded to structural steel. Coordinate delivery of these items to project site.
B. Install aluminum entrances in accordance with manufacturer's installation instructions, reviewed product data, approved shop drawings, and as indicated on Drawings (per Professional Engineer review when applicable).
C. Do not install damaged components.
D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
E. Provide alignment attachments and shims to permanently fasten system to building structure.
F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, [aligning with adjacent work].
G. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
H. Coordinate attachment and seal of membrane materials per architectural drawings. Refer to section 07 25 00.
I. Install accessories with positive anchorage to building, weather tight mounting, provisions for thermal expansion, and coordinate installation with flashings and other components.

J. Install hardware using templates provided. Refer to Section 08 71 00 for hardware installation requirements.
K. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
L. Install perimeter sealant in accordance with Section 07 92 00.
M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
N. Adjust operating hardware for smooth operation.
O. Tolerances:
   1. Maximum variation from plumb: [1/16”] every 3’ non-cumulative, or [1/16”] per 10’, whichever is least.
   2. Maximum Misalignment of two adjoining members abutting in plane: [1/32”].

3.03 CLEANING

A. Comply with AAMA 609 and 610 for methods, equipment, and materials to clean finished aluminum after installation and for subsequent periodic maintenance.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Rinse with clear water. Take care to remove dirt from corners, and wipe surfaces clean.
C. Remove excess sealant from glass and aluminum by method acceptable to sealant and finish manufacturer.

3.04 PROTECTION

A. Protect installed products from damage during subsequent construction.
B. Protect anodized finishes from prolonged exposure to alkaline, such as lime in masonry mortar, or acidic and other corrosive materials.

END OF SECTION 084213

SECTION 08 43 13 – ALUMINUM FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes Basis of Design- Tubelite aluminum storefront and all components and installation accessories supplied with the system.
   1. Tubelite 24650 Series Storefront systems: 2" x 6-1/2"
      a. TU24650 Ultra Thermal Storefront (dual thermal barrier)

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.
B. Pre-installation Meeting:
   a. Attendees: Owner's Representative, Architect, General Contractor, Storefront Installer. Storefront Manufacturer's Representative, and installers whose work interfaces with storefront and glazing,
   2. Agenda:
      a. Review and finalize construction schedule.
      b. Verify availability of materials, installer's personnel, equipment, and facilities required to maintain schedule.
      c. Review means and methods related to installation, including manufacturer's written instructions.
      d. Examine support conditions for compliance with requirements including alignment and attachment to structural members.
      e. Review flashings, membrane interface with storefront, wall penetrations, openings, and conditions of other construction affecting this Work.
      f. Review temporary protection requirements for during and after installation of this Work.

1.03 PERFORMANCE REQUIREMENTS

A. Design Wind Loads
   1. Provide aluminum storefront system with all structural components including but not limited to anchors and mullions based on the following wind load design pressures and the deflection and stress criteria of paragraph 1.04 B. Pressures based on Allowable Stress Design (ASD).
      a. Ultimate Design Wind Speed, V_{ult} (3-Second Gust): 140 MPH
      b. Nominal Design Wind Speed, V_{asd}, (3 Second Gust): 108 MPH
      c. Internal Pressure Coefficient: +/- 0.18 (Enclosed) and +/- 0.55 (Partially Enclosed)
      d. Wind Exposure: C
      e. Air Density Coefficient: 0.86

1.04 PERFORMANCE REQUIREMENTS (continued)

B. Air, Water and Structural Performance:
   1. Air Infiltration Performance:
      a. Shall not exceed 0.06 cfm/ft^2 at 6.24 psf static air pressure differential, when tested per ASTM 283.
   2. Water Infiltration Performance:
      a. Static: No uncontrolled water entry at a 12 psf static pressure differential with water applied at a minimum rate of 5 gal/ft^2 hr when tested per ASTM E 331.

b. Dynamic: No uncontrolled water entry at 12 psf dynamic pressure with water applied at a minimum rate of 5 gal/ft^{2}hr when tested per AAMA 501.1.

3. Structural Performance at design loads:
   a. System to withstand +/- 30 psf when tested per ASTM E330.
      i. Maximum allowable deflection of L/175 of the clear span for spans up to 13'-6" or L/240 of clear spans plus ¼" for spans greater than 13'-6" or an amount that restricts edge deflection of individual glazing lites of glass to ¾" whichever is smaller.
4. Structural Performance at 1.5x design loads:
   a. System to withstand +/- 45 psf when tested per ASTM E330.
      i. There shall be no permanent deformation of main frame members in excess of 0.2% of its clear span, glass breakage, or permanent damage to fasteners or anchors.
5. Thermal Cycling:
   a. There shall be no air and water infiltration exceeding primary performance requirements, buckling, stress on glass, edge seal failure, excess stress on structure, anchors and fasteners, or reduction in performance when tested in accordance with AAMA 501.5 at a temperature range of -20 °F to 180 °F. Interior ambient air temperature at 70°F (+/- 5 °F) for hot and cold cycles.
6. Interstory Differential Horizontal Movement per AAMA 501.4.
   a. 3 cycles: 1.68" left, back to zero, 1.68" right, back to zero (one complete cycle)
      i. There shall be no failure or gross permanent distortion of anchors, frame, glass, or panels. Glazing gaskets may not disengage and weather seals may not fail.
7. Seismic Horizontal Movement at 1.5X design displacement per AAMA 501.4.
   a. 3 cycles: 2.4" left, back to zero, 2.4" right, back to zero (one complete cycle).
      i. There shall be no glass breakage, permanent damage to frame members or anchors.

C. Thermal Transmittance and Condensation Resistance Performance Requirements
1. Thermal transmittance (U-factor) for window system shall not exceed 0.4 BTU/hr-ft^2- ^{O}F per NFRC 100.

   a. U-Factor performance reference data per NFRC 100 thermal simulations:

	24650 SYSTEM U-FACTOR (BTU/hr-ft^2-^{O}F)			
CENTER OF GLASS U-FACTOR (BTU/hr-ft^2-^{O}F)	T24650 (single thermal) *aluminum spacer*	T24650 (single thermal) *warm edge spacer*	**TU24650 (dual thermal) *aluminum spacer***	TU24650 (dual thermal) *warm edge spacer*
0.30	0.43	0.40	**0.40**	0.37
0.29	0.42	0.40	0.39	0.36
0.28	0.41	0.39	0.38	0.36
0.26	0.39	0.37	0.36	0.34
0.24	0.38	0.35	0.35	0.32
0.22	0.35	0.32	0.32	0.29
0.20	0.34	0.31	0.31	0.28
0.18	0.32	0.30	0.30	0.26

2. Solar Heat Gain Coefficient (SHGC) for the window area shall not exceed 0.27 as determined in accordance with NFRC 200.

1.04 SUBMITTALS

A. Product Data:
   1. Manufacturer's literature for each specified system.
   2. Components within assembly, including material descriptions, component profiles, finishes, anchorage and fasteners, glazing, and internal drainage.

B. Shop Drawings:
   1. Shop drawings must be prepared by a qualified engineering service under the employ of the window wall manufacturer.
   2. Include system dimensions, framed opening requirements and tolerances, affected related Work, anchorage, expansion and contraction joint location and details, and field welding required.
   3. Include scaled shop drawings showing detailed relationships with glazing, flashing, internal drainage, joinery, and provisions for thermal expansion.

C. Design Data: Submit framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

D. Samples:
   1. System components: Submit corner samples, anchors, fasteners, trim, and other materials as requested by the architect.
   2. Finish: Submit two aluminum sheet stock samples 2" x 3" for each finish type.

E. Warranty: Submit manufacturer sample warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least twenty years of documented experience.

B. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State that the Project is located.

C. Installer: Company approved by manufacturer and specializing in performing work of this section with at least five years of documented installation experience.

D. Source Limitations: Obtain the storefront and all products listed in Section 1.02 from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Materials to be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.

B. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before fabrication of storefront framing and indicate measurements on Shop Drawings.

C. Install sealant according to sealant manufacturer guidelines.

D. Coordinate installation with other applicable trades.

1.08 WARRANTY

A. Aluminum Storefront Framing Warranty:
   1. Manufacturer agrees to repair or replace defective storefront components for a period of 5 years from the date of shipment.
B. Finish Warranty:
   1. Warranty covers factory-applied organic and anodic finishes on exposed extruded aluminum surfaces without standing water accumulation, against peeling, checking, cracking, chalking and change of color, per applicable AAMA specifications.
      a. Anodized Coatings
         i. AAMA 611 Class I: 5

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Basis of Design: Aluminum Framed Storefront
   1. Tubelite Inc. TU24650 Series Ultra Thermal Storefront: 2” x 6-1/2” dual thermal barrier
   2. Substitutions
      a. Manufacturer’s products that meet specified design requirements may be considered as a substitution. Substitution requests / submittals must include the following, and be submitted at least ten working days prior to the bid date.
         i. Submittal information must include test reports as specified in performance sections.
         ii. Copy of manufactures warranty
         iii. Any additional information as requested
         iv. System details / samples

2.02 ALUMINUM FRAMED STOREFRONT

A. Aluminum Framed Storefront: Factory or field fabricated, field glazed, factory finished aluminum, screw spline construction with infill and related flashings, anchorage and attachment devices.
   1. System dimensions: 2” x 6-1/2”
      a. Exterior face dimensions
         i. Primary mullions: 2”
         ii. Expansion mullion: 2-5/8”
      b. Depth: 6-1/2”
   2. Glazing:
      a. Position: 1-3/4” from exterior
      b. Thickness: 1”
      c. Method: outside glazed, captured and retained with gaskets on all four sides
   3. TU24650 Ultra Thermal barrier
         i. Primary frames: dual pour- debridge
         ii. Vertical snap filler: polyamide strut

2.03 FINISHES

A. Finish all exposed areas of aluminum storefront components in accordance with applicable AAMA Voluntary Finish Guide Specification:

SPECIFICATION	DESCRIPTION	DESIGNATION	COLOR
AAMA 611	Class I - Clear anodize coating, Eco-friendly etch (0.7 mils thick min)	AA-M10C21A41	Clear

A. Combination anodic oxide and transparent organic coatings as defined in AAMA 612 are not equivalent substitutions for the AAMA 611 anodized finishes shown above due to surface hardness disparities.
B. Applicator Qualifications: Certified by AAMA and listed on AAMA Verified Components List.
C. Verify accuracy of components, quantities, and sizes prior to application of finishes.
D. Applicator – Anodize Finishes
    a. Offer both standard eco-friendly (acid) and optional caustic (traditional) etching technologies.
    b. Utilize fully automated, computer-controlled process lines for consistency through Project.
    c. Utilize documented quality control protocol in accordance with AAMA 611 procedures.
        i. Online quality assurance inspection:
            1. Random sample check for color uniformity, maximum difference of 5AE.
            2. Random coating thickness testing:
                a. Class I clear and color anodize – 0.7 mils (18 microns)

2.04 MATERIALS

A. Aluminum extrusions: Alloy 6063-T6 or 6063-T5 in accordance with ASTM B221, and extruded within commercial tolerances and free from defects that impair strength and/or durability.
B. Primary extruded framing members will be a minimum 0.075" thick.
C. Extruded or formed trim components will be a minimum 0.060" thick.
D. Structural Steel Reinforcement and anchors necessary to meet the performance requirements of 1.04.
    1. ASTM A36/A36M; galvanized per ASTM A123/A123M.
    2. Where galvanizing is not compatible with alloy of component parts, apply heavy coating of epoxy paint where necessary to prevent galvanic action with dissimilar materials.
E. Galvanizing Repair Paint: High zinc content paint for over welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and in compliance with SSPC Paint 20.
F. Bituminous Paint: Cold applied asphalt mastic, containing no asbestos fibers.
G. Thermal Barrier:
    1. Pour and debridge thermal barrier shall be a two part chemically curing polyurethane casting resin poured in place. specified. Thermal barrier extrusion pour cavities shall be mechanically lanced to secure the thermal break material. The aluminum bridge section must be removed to provide a nominal ¼” separation between exterior and interior metal surfaces.
    2. Continuous extruded polyamide with 25% glass fiber reinforcing, mechanically crimped into cross-knurled cavities
H. Glazing and Sealant material:
    1. Setting blocks and Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual. Setting blocks used in conjunction with soft-coat low-e glass shall be silicone.
    2. Glazing gaskets shall be EPDM [silicone], weather-resistant, and compatible with all materials in contact.
    3. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.

4. Frame joinery sealants shall be suitable for application specified and as tested and approved by the storefront manufacturer.

2.05 FABRICATION

A. Ensure joints and corners are flush, hairline and weatherproof, accurately fitted and secured.
   1. Prepare framework to receive anchors and hardware.
   2. Conceal fasteners and attachments from view.
   3. Reinforce framework as required for imposed loads.
B. Expansion and Contraction: Fabricate to allow for thermal movement of materials when subjected to project temperature differential requirements.
C. System Internal Drainage: Drain to exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   1. Fabricate drainage system so weeps and flashings are integral to system and others are not required.
D. Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
E. Provide for membrane interface as indicated on architectural drawings

2.06 COMPONENTS

A. Glass
   1. Provide in accordance with Section 08 80 00.
B. Glazing
   1. Glazing method shall be in accordance with manufacturer installation instruction and the GANA Glazing Manual for specified glass type, or as approved by the glass fabricator.
   2. Refer to Section 08 80 00 for requirements.

PART 3 – EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of this Work.
B. Notify Contractor in writing, with a copy sent to Owner and Architect, of any conditions detrimental to proper and timely completion of this Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Start of this Work shall indicate acceptance of areas and conditions as satisfactory by the Installer.

3.02 INSTALLATION

A. Preparation: Coordinate and furnish anchors, concrete inserts, sleeves, anchor bolts, and other accessories to be embedded in concrete or masonry construction or welded to structural steel. Coordinate delivery of these items to project site.
B. Install aluminum storefront framing in accordance with manufacturer's installation instructions, reviewed product data, approved shop drawings, and as indicated on Drawings per Professional Engineer review when applicable.
C. Do not install damaged components.
D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
E. Provide alignment attachments and shims to permanently fasten system to building structure.
F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

G. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
H. Install accessories with positive anchorage to building, weather tight mounting, provisions for thermal expansion, and coordinate installation with flashings and other components.
I. Install hardware using templates provided.
   1. Refer to Section 08 71 00 for hardware installation requirements.
J. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
K. Install perimeter sealant in accordance with Section 07 92 00.
L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
M. Adjust operating hardware for smooth operation.
N. Tolerances:
   1. Maximum variation from plumb: [1/16”] every 3’ non-cumulative, or [1/16”] per 10’, whichever is least.
   2. Maximum Misalignment of two adjoining members abutting in plane: [1/32”].

3.03 CLEANING

A. Comply with AAMA 609 and 610 for methods, equipment, and materials to clean finished aluminum after installation and for subsequent periodic maintenance.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners, and wipe surfaces clean.
C. Remove excess sealant from glass and aluminum by method acceptable to sealant and finish manufacturer.

3.04 PROTECTION

A. Protect installed products from damage during subsequent construction.
B. Protect anodized finishes from prolonged exposure to alkaline, such as lime in masonry mortar, or acidic and other corrosive materials.

END OF SECTION 084313

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:

a. Swinging doors.

2. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Related Sections:

1. Division 084213 Section "Monumental Entrance Doors"

1.03 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

    a. Wiring Diagrams: For power, signal, and control wiring and including:
        1) Details of interface of electrified door hardware and building safety and security systems.
        2) Schematic diagram of systems that interface with electrified door hardware.
        3) Point-to-point wiring.
        4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.

    a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

    a. Door Index; include door number, heading number, and Architects hardware set number.
    b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
    c. Quantity, type, style, function, size, and finish of each hardware item.
    d. Name and manufacturer of each item.
    e. Fastenings and other pertinent information.
    f. Location of each hardware set cross-referenced to indications on Drawings.
    g. Explanation of all abbreviations, symbols, and codes contained in schedule.
    h. Mounting locations for hardware.
    i. Door and frame sizes and materials.
    j. Name and phone number for local manufacturer's representative for each product.

k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
   1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

   a. Keying conferences and keying will all go through PSD Lockshop. Spreadsheets of locksets should be given to PSD Lockshop to fill in keying details to be sent to manufacturer.
   b. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   c. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   d. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   e. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   f. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
      1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

   g. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:

   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

3. Certificates of Compliance:

   a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.

b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.

4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule, edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.

a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
4. Capable of producing wiring diagrams.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

G. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

    a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
    b. Preliminary key system schematic diagram.
    c. Requirements for key control system.
    d. Requirements for access control.
    e. Final Keys and Lock cores are to be delivered to PSD Lockshop for final install.

H. Pre-installation Conference

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys to Owner by registered mail or overnight package service.

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.

a. Closers:
1) Mechanical: 30 years.

b. Automatic Operators: 2 years.
c. Exit Devices:
1) Mechanical: 3 years.
2) Electrified: 1 year.

d. Locksets:
1) Mechanical: 10 years.
2) Electrified: 1 year.

e. Continuous Hinges: Lifetime warranty.
f. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: “No Substitute.”

1. Where “No Substitute” is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series.
2. Acceptable Manufacturers and Products: Hager BB series, McKinney TA/T4A

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

    a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
    b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

    a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
    b. Interior: Heavy weight, steel, 5 inches (127 mm) high

4. 2 inches or thicker doors:

    a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

a. Steel Hinges: Steel pins
b. Non-Ferrous Hinges: Stainless steel pins
c. Out-Swinging Exterior Doors: Non-removable pins
d. Out-Swinging Interior Lockable Doors: Non-removable pins
e. Interior Non-lockable Doors: Non-rising pins

8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
10. Provide mortar guard for each electrified hinge specified.
11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 CONTINUOUS HINGES

A. Aluminum Geared

1. Manufacturers:

a. Scheduled Manufacturer: Ives.
b. Acceptable Manufacturers: Select, ABH.

2. Requirements:

a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
g. Install hinges with fasteners supplied by manufacturer.
h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

a. Scheduled Manufacturer: Von Duprin EPT-10.
b. Acceptable Manufacturers: ABH PT1000, Securitron CEPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: ABH, Rockwood.

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: ABH, Rockwood.

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage ND series.
2. Acceptable Manufacturers and Products: No substitution

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

    a. Lever Design: Schlage Rhodes

2.09 EXIT DEVICES

A. Manufacturers and Products:

1. **1.** Scheduled Manufacturer and Product: Von Duprin 99 series.
2. Acceptable Manufacturers and Products: No Substitution

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide MT54 Mullion wall mount kit with all removable mullions.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.10 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Locknetics NC450 Series
2. Acceptable Manufacturers and Products: Von Duprin 6300 Series, HES 8000/9000 Series, Trine 4850/EN Series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary-resistant.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage/Von Duprin PS900 series.

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:

    a. 12/24 VDC Output, field selectable.
    b. Class 2 Rated power limited output.
    c. Universal 120-240 VAC input.
    d. Low voltage DC, regulated and filtered.
    e. Polarized connector for distribution boards.
    f. Fused primary input.
    g. AC input and DC output monitoring circuit w/LED indicators.
    h. Cover mounted AC Input indication.
    i. Tested and certified to meet UL294.
    j. NEMA 1 enclosure.
    k. Hinged cover w/lock down screws.
    l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Schlage, Large Format Interchangeable core

B. Requirements:

1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide the following keyway: Match existing system as directed by Owner.

C. Construction Keying:

1. Replaceable Construction Cores.

a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
   1) 3 construction control keys
   2) 12 construction change (day) keys.

b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Provide cylinders/cores keyed into Owner's existing factory registered keying system.

C. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

D. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:

a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
b. Patent Protection: Keys and blanks protected by one or more utility patent(s) until the year, 2029.

4. Identification:

a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.

b. Identification stamping provisions must be approved by the Architect and Owner.
c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4010/4110/4020 series.
2. Acceptable Manufacturers and Products: No substitution.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4600 series.

2. Acceptable Manufacturers and Products: No substitution

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.
6. Provide drop plates, brackets, or adapters for arms as required for details.
7. Provide hard-wired actuator switches for operation as specified.
8. Provide weather-resistant actuators at exterior applications.
9. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: DonJon, Rockwood.

B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.

5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Trimco, Rockwood.

B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:

    a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.18 OVERHEAD STOPS

A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson.
2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.19 DOOR STOPS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: DonJo, Trimco, Rockwood.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International.
2. Acceptable Manufacturers: National Guard, Pemko.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
    a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
    b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.21 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: ABH, Rockwood.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.

2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.22 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Weatherstripping: Clear Anodized Aluminum
9. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Owner to install permanent cores.

I. Wiring::

1. Reference Door Hardware Responsibility Matrix on Drawings
2. Conduit, junction boxes and wire pulls.
3. Connections to and from power supplies to electrified hardware.
4. Connections to fire/smoke alarm system and smoke evacuation system.
5. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
6. Testing and labeling wires with Architect’s opening number.

J. Key Control System: PSD Lockshop to control.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

R. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 FIELD QUALITY CONTROL

A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.

1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.04 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. HARDWARE SETS:

HARDWARE GROUP NO. 1
FOR USE ON MARK/DOOR #(S): E100C
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	027XY TWP CON	US28	IVE
1	EA	MULLION STORAGE KIT	MK-60	689	SPE
1	EA	REMOVABLE MULLION	SL60	689	SPE
2	EA	ELEC PANIC DEVICE	SD-LX-RX-QEL-99-EO 24 VDC	626	VON
2	EA	MORTISE CYLINDER	20-061-SCHLAGE STRAIGHT CAM	626	SCH
1	EA	MORTISE CYLINDER	20-060 -ADAMS RITE CAM	626	SCH
3	EA	FSIC CORE	23-030 EV D145	626	SCH
2	EA	DOOR PULL	RM 4402LH TYPE 6 HD	630	ROC
1	EA	OVERHEADSTOP	904S	US32D	GLY
1	EA	SURFACE CLOSER	4111-3077SCNS EDA TBWMS	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 MS AS REQ (120 VAC)(Flush Ceiling Mount)		ALUM LCN
2	EA	WEATHER RING	8310-800	BLK	LCN
2	EA	ACTUATOR	WALL MOUNT 8310-3860T	630	LCN
2	EA	WIRELESS RECEIVER	8310-880		LCN
2	EA	TRANSMITTER	8310-886		LCN
1	SET	SEALS	BY ALUM DOOR/FRAME MANUFACTURER		
2	EA	DOOR SWEEP	BY ALUM DOOR/FRAME MANUFACTURER		
1	EA	THRESHOLD	172A-K (W/ PEMKOTE OPTION)	AL	PEM
2	EA	DOOR POSITION SWITCH	PROVIDED BY SECURITY CONTRACTOR		
1	EA	POWER SUPPLY	PS906 (2) 900-4RL 120/240 VAC (Will drive all six QEL devices)		SCH

HARDWARE GROUP NO. 2
FOR USE ON MARK/DOOR #(S): E100A / E100B
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2 EA	CONT. HINGE	027XY TWP CON	US28	IVE
1 EA	STANDARD MULLION	SL60	689	SPE
2 EA	ELEC PANIC HARDWARE	SD- LX-RX-QEL-99-EO 24 VDC	626	VON
2 EA	MORTISE CYLINDER	20-061 ICX 36-083	626	SCH
2 EA	FSIC CORE	23-030 EV D 145	626	SCH
2 EA	DOOR PULL	RM 4402LH TYPE 6 HD	630	ROC
2 EA	SURFACE CLOSER	4111-3077SCNS EDA TBWMS	689	LCN
1 SET	SEALS	BY ALUM DOOR/FRAME MANUFACTURER		
2 EA	DOOR SWEEP	BY ALUM DOOR/FRAME MANUFACTURER		
1 EA	THRESHOLD	172A-K (W/ PEMKOTE OPTION)	AL	PEM
2 EA	DOOR POSITION SWITCH	PROVIDED BY SECURITY CONTRACTOR		

HARDWARE GROUP NO. 3
FOR USE ON MARK/DOOR #(S): E101C
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2 EA	CONT. HINGE	027XY	US28	IVE
2 EA	DOOR PULL	RM 4402LH TYPE 6 HD	630	ROC
2 EA	DOOR PUSH	RM 4450LH CTC 31" TYPE 6 HD	630	ROC
1 EA	SURFACE CLOSER	4111-3077SCNS EDA TBWMS	689	LCN
1 EA	SURF. AUTO OPERATOR	4642 MS AS REQ (120 VAC)(Flush Ceiling Mount)		ALUM LCN
1 EA	OVERHEAD STOP	904S	US32D	GLY
2 EA	WEATHER RING	8310-800	BLK	LCN
2 EA	ACTUATOR	WALL MOUNT 8310-3860T	630	LCN
2 EA	WIRELESS RECEIVER	8310-880		LCN
2 EA	TRANSMITTER	8310-886		LCN
1 SET	SEALS	BY ALUM DOOR/FRAME MANUFACTURER		

HARDWARE GROUP NO. 4
FOR USE ON MARK/DOOR #(S): E101A / E101B
EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2 EA	CONT. HINGE	027XY	US28	IVE
2 EA	DOOR PULL	RM 4402LH TYPE 6 HD	630	ROC
2 EA	DOOR PUSH	RM 4450LH CTC 31" TYPE 6 HD	630	ROC
2 EA	SURFACE CLOSER	4111-3077SCNS EDA TBWMS	689	LCN
1 SET	SEALS	BY ALUM DOOR/FRAME MANUFACTURER		

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows
2. Doors
3. Sidelights

B. Related Requirements:

1. Section 084213 “Monumental Entrance Doors”
2. Section 084313 "Aluminum Storefront”

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.3 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Wind Design Criteria is 100mph, exposure B with an importance factor of 1.15.
1. Wind pressure for components and cladding are:
    a. Internally: 15 psf/-16 psf
    b. Within 5 feet of a corner: 15 psf/-18 psf

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product; 12 inches (300 mm) square.

1. Tempered glass
2. Laminated Safety Glass
3. Insulating Glazing Units.

C. Glazing Accessory Samples: For gaskets, sealants and spacers, in 12-inch (300-mm) lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass and glazing products, from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

C. Preconstruction adhesion and compatibility test report.

D. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain products from single source, from single manufacturer, for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA's "Glazing Manual."
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
   3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
   4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC, other certification agency acceptable to authorities having jurisdiction, or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.

J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 60 deg F.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
1. Glass Thickness for Exterior Lites: Not less than 1/4 inch (6.0 mm).
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. For uncoated glass, comply with requirements for Condition A.
   3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.3 INSULATING GLASS - GENERAL

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
   1. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary.
   2. Spacer: Aluminum with mill or clear anodic finish.
   3. Desiccant: Molecular sieve or silica gel, or blend of both.
   4. Provide capillary tubes, to be sealed after installation.

B. Insulated Glazing Units: Heat-strengthened float glass. ASTM C 1376, coated by pyrolytic process, or vacuum deposition (sputter-coating) process, and complying with other requirements specified.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Oldcastle Glass Solarban 70, or comparable product by one of the following:
      a. Cardinal.
      b. PPG
   2. Kind: Kind CV (coated vision glass).
   3. Coating Color: Clear.
   4. Glass: Clear float.
   5. Visible Light Transmittance: 64% percent minimum.
   6. Light to Solar Gain Ratio (LSG): 1.85.
   7. Winter u-value of 0.28
   8. Solar heat gain coefficient of 0.27

2.4 TEMPERED GLAZING

A. Safety Glazing (SG): Conforming to ANSI Z97.1 with minimum thickness of ¼ inch.
   1. Fully tempered: ASTM C1048, Kind FT Fully Tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Cardinal.
      b. PPG
      c. Oldcastle

2.5 LAMINATED GLASS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cardinal.
   b. PPG
   c. Oldcastle

B. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

   1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.
   2. Interlayer Color: Clear unless otherwise indicated.

C. Windborne-Debris-Impact-Resistant Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, with "Windborne-Debris-Impact Resistance" Paragraph in "Glass Products, General" Article, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

   1. Construction: Laminate glass with[one of] the following to comply with interlayer manufacturer's written recommendations:

      a. Polyvinyl butyral interlayer.
      b. Cast-in-place and cured-transparent-resin interlayer.
   2. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATED SPANDREL PANELS

A. Panels - Laminated

Laminated metal faced MapeShield panels as manufactured by Mapes Industries, Inc.

1. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.

B. Finish
   1. Exterior: Smooth Mill Aluminum to match Aluminum Storefront system.
   2. Interior: Smooth Mill Aluminum to match Aluminum Storefront system.

C. Panel Fabrication
   1. Exterior Substrate: Cement Board
   2. Impact Resistant Layer: Galvanized Steel
   3. Cores: Isocyanurate
   4. Interior Substrate: Cement Board

5. Tolerances - .8% of panels dimension length and width - (+/-) 1/16" thickness
6. Panel Thickness - 1"
7. R-Value - 6.18
8. U-Value - 0.16

2.04 - Accessories

1. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
2. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

2.7 GLAZING SEALANTS

A. General:
   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   4. Colors of Exposed Glazing Sealants: Clear.

B. Glazing Sealant: Acid-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Basis-of-Design product: Subject to compliance with requirements, provide Dow Corning 999-A, or an equivalent product by one of the following:
      a. BASF Building Systems.
      b. Bostik, Inc.
      c. Dow Corning Corporation.
      d. GE Advanced Materials - Silicones.
      e. Pecora Corporation.
      f. Tremco Incorporated.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Products: Subject to compliance with requirements, provide one of the following products:
1. 3M Weatherban Ribbon Sealer, 1/16 inch thick.
2. Or approved equal.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness recommended by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

2.11 INSULATING-GLASS UNITS

A. Glass Type 1: South and East-facing Glazing.
1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 5.0 mm.
3. Outdoor Lite: Tinted Float Glass 1 with Solargray.

4. Interspace Content: Air.
5. Indoor Lite: Vision Glass 1 with Solarban 70 on surface 3.
6. Visible Light Transmittance: 64%
7. Winter Nighttime U-Factor: .28 maximum.
8. Solar Heat Gain Coefficient: 0.27

B. Glass Type 2: All North-facing Glazing.
1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 5.0 mm.
3. Outdoor Lite: Vision Glass 1 with Solarban 60 on surface 2.
4. Interspace Content: Air.
5. Indoor Lite: Heat-strengthened float glass.
6. Winter Nighttime U-Factor: .33 maximum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Provide fully-tempered glass units where required by the 2003 International Building Code, and in all operable sashes and at glass units mounted less than 18 inches from the floor.

C. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Center glass units in rabbet in order to maintain recommended clearances at perimeter on all four sides, inside and out. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Maintain 1/8 inch clearance between glass face and metal stops.

H. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

I. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

J. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

K. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

L. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

M. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

N. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient base.
   2. Resilient molding accessories.

B. Related Requirements:
   1. Section 124813Entrance Floor Mats.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

C. Samples: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 linear feet (3 linear m) of each type, color, pattern, and size of resilient product installed.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for installation of resilient base and accessories.
   1. Engage an installer who employs workers for this Project who are trained or certified by the manufacturer for installation techniques required.
   2. Installer shall have a minimum of 5 years experience on similar installations, and/or be certified by the manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the jobsite in original unopened containers that bear the name and brand of the manufacturer.

B. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

PART 2 - PRODUCTS

2.1 RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Burke Industries Inc.
   2. Johnsonite
   3. Flexco.
   4. R.C. Musson Rubber Company
   5. Roppe Corporation, USA.

B. Top-set coved rubber base:
   1. Thickness: 0.125 inch (3.2 mm).
   2. Height: 4” inches

C. Lengths: Cut lengths 48 inches (1219 mm) long.

D. Outside Corners: Job formed.

E. Inside Corners: Job formed.

F. Colors: Matte finish black, or as otherwise indicated.

2.2 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Burke Industries Inc.
   2. Johnsonite
   3. Flexco.

4. R.C. Musson Rubber Company
5. Roppe Corporation, USA.

B. Description: Rubber reducer strip for resilient flooring.

C. Locations: Between new resilient flooring and new walk-off mat.

D. Profile and Dimensions: As appropriate for the transition required, as recommended by the manufacturer, and as indicated.

E. Colors and Patterns: Matte finish black, or as otherwise indicated.

2.3 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
   1. Outside Corners: Use straight pieces and form with returns not less than 24 inches in length.
      a. Form without producing discoloration (whitening) at bends.
   2. Outside Corners: Terminate base at bullnose corners where run after bullnose is less than 2 inches. Paint CMU black to height of Rubber Base to door frame or next termination point.
   3. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 24 inches in length.
      a. Miter corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at connections between new resilient flooring and new carpet.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear until Substantial Completion.

END OF SECTION 096513

SECTION 124813 - ENTRANCE FLOOR MATS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Floor-tile entrance mats.

B. Related Requirements:
   1. Section 096513 Resilient Base and Accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products, in manufacturer's standard sizes:
   1. Full-size units of each color and pattern of entrance mat required.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For floor mats, to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Provide 10 extra units in un-opened original containers, but not less than 1% of each type and color entrance mat specified.

PART 2 - PRODUCTS

2.1 FLOOR-TILE ENTRANCE MATS

A. Subject to compliance with requirements, provide:
   1. Tandus
   2. Mannington
   3. Mohawk

B. Tiles: Nylon face bonded to 100% recycled secondary backing, 24 inch x 24 inch.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation approved by floor tile manufacturer for applications indicated.
   1. Products: Webcrete, by DAP, or approved equal.

B. Adhesives: Water-resistant type recommended by tile and adhesive manufacturers to suit floor tile and substrate conditions.
   1. Factory-installed full-spread pressure-sensitive.

C. Moisture Barrier: Top Coat II, 7055 by Installers Best Adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and floor conditions for compliance with requirements for location, sizes, and other conditions affecting installation of floor mats.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor mat manufacturer's written instructions to ensure adhesion of products.

B. Concrete Substrates:
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Apply moisture barrier to all un-sealed concrete slab surfaces.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor mat tiles until they are the same temperature as the space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by floor mat.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for installing floor mat.

B. Lay out floor mat tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

C. Match floor mat tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit floor mat tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor mat tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Install floor mat tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere floor mat tiles to flooring substrates to produce a completed installation without open cracks, voids, raising and puckering at joints, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing floor mat:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from mat surface.
   3. Vacuum floor mat using commercial machine with face-beater element.

B. Protect floor mat against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by floor mat manufacturer.

END OF SECTION 124813